

Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 2 *Dairy Research (1984-2014)*

Article 289

2003

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Recommended Citation

Burkitt, E.L.; Miller, W.F.; Scheffel, Michael V.; and Titgemeyer, Evan C. (2003) "Effect of two new teat dip prepatations on teat condition, somatic cell count, and incidence of mastitis under natural exposure," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 2. <https://doi.org/10.4148/2378-5977.3214>

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Effect of two new teat dip prepatations on teat condition, somatic cell count, and incidence of mastitis under natural exposure

Abstract

Application of an iodophor teat dip before and after milking is a common practice in the dairy industry as an effective method of preventing mastitis by reducing microbial populations at the teat end. Overall effectiveness of a teat dip is a function of its ability to reduce the microbial population and maintain a pliable teat skin condition. The objective of this study was to evaluate a new conditioning component in iodophor teat dips containing either 0.5% or 1.0% iodine. Two experiments were conducted during late winter (133 cows) and during summer (104 cows) to evaluate two new iodophor teat dips developed by KO Manufacturing, Inc., Springfield, Mo. The two teat dips contain a nontraditional conditioning agent designed to sustain the lipid bilayer of the teat skin and improve skin condition. Dinerin (0.5% iodine) was equally effective as Westfalia-Surge Derma-Kote during the winter study in preventing new mammary infections based on the number of new clinical cases of mastitis and somatic cell counts. Teat and teat end condition were similarly maintained by both teat dips during the winter study. Two Dinerin teat dips, 0.5% and 1.0% iodine, were compared to Westfalia-Surge Teat-Kote 10-3 (0.5% iodine) during the summer. The Dinerin 0.5% iodine dip was most effective in preventing new cases of clinical mastitis. Teat and teat end conditions were maintained similarly by all three dips. Somatic cell counts were similar among treatments when cows that developed clinical mastitis were deleted from the analysis. The numbers of clinical mastitis cases were 5, 0, and 6 for cows dipped with Westfalia-Surge Teat-Kote 10-3, Dinerin 0.5% iodine, and Dinerin 1.0% iodine, respectively.; Dairy Day, 2003, Kansas State University, Manhattan, KS, 2003;

Keywords

Diary Day, 2003; Kansas Agricultural Experiment Station contribution; no. 04-129-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 919; Dairy; Teat dips; Mastitis; Somatic cells

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EFFECT OF TWO NEW TEAT DIP PREPARATIONS ON TEAT CONDITION, SOMATIC CELL COUNT, AND INCIDENCE OF MASTITIS UNDER NATURAL EXPOSURE

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Summary

Application of an iodophor teat dip before and after milking is a common practice in the dairy industry as an effective method of preventing mastitis by reducing microbial populations at the teat end. Overall effectiveness of a teat dip is a function of its ability to reduce the microbial population and maintain a pliable teat skin condition. The objective of this study was to evaluate a new conditioning component in iodophor teat dips containing either 0.5% or 1.0% iodine. Two experiments were conducted during late winter (133 cows) and during summer (104 cows) to evaluate two new iodophor teat dips developed by KO Manufacturing, Inc., Springfield, Mo. The two teat dips contain a nontraditional conditioning agent designed to sustain the lipid bilayer of the teat skin and improve skin condition. Dinerin (0.5% iodine) was equally effective as Westfalia-Surge Derma-Kote during the winter study in preventing new mammary infections based on the number of new clinical cases of mastitis and somatic cell counts. Teat and teat end condition were similarly maintained by both teat dips during the winter study. Two Dinerin teat dips, 0.5% and 1.0% iodine, were compared to Westfalia-Surge Teat-Kote 10-3 (0.5% iodine) during the summer. The Dinerin 0.5% iodine dip was most effective in preventing new cases of clinical mastitis. Teat and teat end conditions were maintained similarly by all three dips. Somatic cell counts were similar among treatments when cows that developed clinical

mastitis were deleted from the analysis. The numbers of clinical mastitis cases were 5, 0, and 6 for cows dipped with Westfalia-Surge Teat-Kote 10-3, Dinerin 0.5% iodine, and Dinerin 1.0% iodine, respectively.

(Key Words: Teat Dips, Mastitis, Somatic Cells)

Introduction

According to the National Mastitis Council, the estimated annual mastitis loss to the dairy industry exceeds \$1.7 billion in the United States. Measures recommended by the council to prevent mastitis include dipping teats after milking with iodophor teat dips to reduce microbial populations at the teat-end. Iodophor teat dips can dry the skin and cause chapping, resulting in discomfort to the cow, reduced milk letdown, and increased intramammary infection. Teat end callosity and roughness have been reported to have a direct relationship with clinical mastitis. Teat dips containing 1.0% iodine effectively reduce microbial populations, but may cause chapping of the skin, depending on the type and amount of conditioner included in the formulation. Reducing the iodine content, combined with an effective conditioner, should reduce teat chapping, but may not reduce the teat-end microbial population sufficiently to prevent intramammary infections. A new teat dip (Dinerin, from KO Manufacturing, Inc., Springfield, Mo.) that contains a blend of glycerin and natural lipids as the conditioning ingredi-

ents was developed recently. This conditioner is designed to help sustain the skin's lipid bilayer by filling gaps and replacing unhealthy skin. The purpose of this study was to evaluate the conditioning effectiveness of Dinerin relative to that of a standard teat dip that contains glycerin as the conditioning agent.

Procedures

Two experiments were conducted during a 60-day period of late winter (133 cows) and during a 90-day period of summer (104 cows) to evaluate two new iodophor teat dips. In the winter study, cows were paired on parity, milk yield, somatic cell count, and previous cases of clinical mastitis. Cows within pairs were allotted randomly to treatment. Pretreatment milk yield, milk components, somatic cell count, teat-end scores, and teat condition were determined and used in covariate analysis. Treatments during the winter study include Westfalia-Surge Derma-Kote (0.5% iodine) and Dinerin (0.5% iodine dip from KO Manufacturing, Inc., Springfield, Mo.). In the summer study, cows were blocked (three cows per block) as in the winter study and assigned randomly to three treatments: 1) Westfalia-Surge Teat-Kote 10-3 (1.0% iodine), Dinerin (0.5% iodine), and Dinerin (1.0% iodine).

Daily milk yield was recorded, and weekly milk samples (a.m./p.m. composite) were collected for content analysis of fat, protein, lactose, somatic cells, and milk urea nitrogen by the Heart of America DHI laboratory, Manhattan, Kan. Teat ends were scored at the beginning and end of each experiment, and incidences of chapping and clinical mastitis were recorded throughout. Teat condition was evaluated at the beginning and end of each experiment.

Results and Discussion

Yield and composition of milk for the winter and summer experiments are summarized in Tables 1 and 2, respectively. These measures were included to demonstrate that high milk-producing cows were assigned to treatments and would be sensitive to mammary gland insults, resulting in decreased milk yields. Milk and energy-corrected milk yields were similar across treatments for both studies. Differences in milk yield were not expected because too few cows were assigned to treatments to detect differences in yield and because those cows that were diagnosed with clinical mastitis were deleted from the summary of traits in Tables 1 and 2.

During the winter study, two cows treated with Westfalia-Surge Derma-Kote and three cows treated with Dinerin WinterGuard exhibited clinical mastitis. Numbers of clinical mastitis cases during the summer study were 5, 0, and 6 for Westfalia-Surge Teat-Kote 10-3, Dinerin 0.5%, and Dinerin 1.0%, respectively. Absence of clinical cases in the cows treated with Dinerin 0.5% suggests that the Dinerin 1.0% iodine product may have been too harsh compared to the Dinerin 0.5% iodine product, regardless of the conditioner used.

Treatment effects on somatic cell count (SCC) are summarized in Tables 3 and 4. Results were analyzed several ways because of the impact one or two cows might have on treatment outcomes. Regardless of analysis for sorting technique, all treatments seemed to be equally effective in maintaining similar SCC during both winter and summer. Somatic cell counts listed in Tables 3 and 4 do not include those for cows with clinical mastitis during the study.

The effect of treatments on teat and teat end condition is shown in Table 5. Teat dips had no negative effects on teat or teat end conditions during the winter or summer. Results for the summer study are not shown because they were similar to data collected during the winter.

Conclusion

The teat dips used in this study were equally effective in maintaining teat condition and somatic cell count. The Dinerin 0.5% dip appeared to reduce the incidence of clinical mastitis during the summer study. Additional work with larger numbers of cows is needed to confirm these findings.

Table 1. Effect of Teat Dips on Milk Yield and Composition of Milk (Winter Study)

Item ¹	Primiparous		Multiparous		<i>P</i> value		
	Derma-Kote	Dinerin	Derma-Kote	Dinerin	Treatment	Parity	TxP
No. of cows	23	25	44	41			
Milk, lb/day	90.0	95.3	90.2	91.5	0.90	0.19	0.17
ECM, lb/day	90.9	90.9	90.0	93.7	0.68	0.59	0.30
Fat, %	3.64	3.46	3.40	3.53	0.05	0.32	0.05
Protein, %	3.09	3.20	3.14	3.13	0.15	0.65	0.01
Lactose, %	4.95	5.00	4.95	4.94	0.32	0.10	0.07
SNF, %	8.97	9.17	8.99	9.02	0.66	0.04	0.01
MUN, mg/dL	16.23	16.48	16.73	16.66	0.03	0.05	0.37
Fat, lb/day	1.44	1.38	1.41	1.50	0.33	0.32	0.11
Protein, lb/day	1.26	1.38	1.28	1.29	0.54	0.16	0.01
Lactose, lb/day	2.03	2.17	2.04	2.06	0.67	0.12	0.08

¹Values have been adjusted for covariates (parity, previous milk yield, somatic cell count, and previous case of mastitis).

Table 2. Effect of Teat Dips on Milk Yield and Composition of Milk (Summer Study)

Item ¹	Primiparous			Multiparous			<i>P</i> value		
	Teat-Kote 10-3	Dinerin-0.5%	Dinerin-1.0%	Teat-Kote 10-3	Dinerin-0.5%	Dinerin-1.0%	Treat-ment	Parity	TxP
No. of cows	15	16	13	19	21	20			
Milk, lb/day	81.2	80.5	84.5	81.0	77.4	82.7	0.51	0.20	0.66
ECM, lb/day	82.1	82.5	85.1	79.6	78.3	83.6	0.02	0.07	0.78
Fat, %	3.62	3.72	3.50	3.41	3.48	3.56	0.98	0.07	0.18
Protein, %	3.15	3.10	3.15	3.14	3.17	3.15	0.05	0.28	0.17
Lactose, %	4.99	4.93	4.99	4.90	4.93	4.93	0.03	0.01	0.17
SNF, %	9.08	8.95	9.05	8.96	9.03	9.01	0.01	0.44	0.02
MUN, mg/dL	17.61	16.66	17.27	16.75	16.72	17.31	0.13	0.33	0.25
Fat, lb/day	2.88	2.97	2.93	2.71	2.75	2.93	0.06	0.08	0.46
Protein, lb/day	2.53	2.49	2.64	2.51	2.42	3.92	0.27	0.28	0.95
Lactose, lb/day	4.05	3.98	4.22	3.98	3.83	4.09	0.09	0.12	0.92

¹Values have been adjusted for covariates (parity, previous milk yield, somatic cell count, and previous cases of mastitis).

Table 3. Effect of Teat Dips on Somatic Cell Counts (Winter Study)

Item ¹	Primiparous		Multiparous		<i>P</i> value		
	Derma-Kote	Dinerin	Derma-Kote	Dinerin	Treat-ment	Parity	TxP
No. of cows	23	25	45	43			
SCC × 100 ^a	79	123	250	355	0.39	0.02	0.72
No. of cows	23	25	44	41			
SCC × 100 ^b	49	58	122	135	0.59	0.01	0.92
No. of cows	52	62	44	41			
SCC × 100 ^c	52	62	126	138	0.60	0.01	0.94

¹Values have been adjusted for covariates (parity, previous milk yield, somatic cell count, and previous cases of mastitis).

^aAll SCC values used in analysis.

^bValues above 800,000 SCC removed.

^cValues above 998,000 SCC removed.

Table 4. Effect of Teat Dips on Somatic Cell Counts (Summer Study)

Item ¹	Primiparous			Multiparous			<i>P</i> value		
	Teat-Kote 10-3	Dinerin-0.5%	Dinerin-1.0%	Teat-Kote 10-3	Dinerin-0.5%	Dinerin-1.0%	Treat-ment	Parity	TxP
No. of cows	15	16	13	19	21	20			
SCC × 100 ^a	293	274	585	428	322	221	0.67	0.54	0.09
No. of cows	15	16	13	19	21	20			
SCC × 100 ^b	115	74	124	215	168	139	0.43	0.02	0.44
No. of cows	15	16	13	19	21	20			
SCC × 100 ^c	123	69	132	226	198	191	0.59	0.01	0.70

¹Values have been adjusted for covariates (parity, previous milk yield, somatic cell count, and previous cases of mastitis).

^aAll SCC values used in analysis: SCC x treatment, SCC x parity, and SCC x treatment x parity interaction..

^bValues above 800,000 SCC removed: SCC x treatment, and SCC x treatment x parity interaction.

^cValues above 998,000 SCC removed: SCC x treatment, SCC x treatment x parity interaction.

Table 5. Effect of Teat Dips on Teat Condition and Teat Ends (Winter Study)

Item ¹	Primiparous		Multiparous		<i>P</i> value		
	Derma-Kote	Dinerin	Derma-Kote	Dinerin	Treat-ment	Parity	TxP
No. of cows	21	26	45	46			
Left front teat	1.81	2.04	2.04	1.97	0.51	0.54	0.23
Right front teat	1.73	2.07	1.93	1.91	0.19	0.87	0.15
Left rear teat	1.39	1.57	1.59	1.56	0.46	0.36	0.33
Right rear teat	1.42	1.78	1.69	1.56	0.28	0.82	0.03
Left front end	2.59	2.45	2.75	2.812	0.63	0.01	0.21
Right front end	2.63	2.59	2.86	2.82	0.64	0.01	0.95
Left rear end	2.27	2.33	2.55	2.53	0.83	0.01	0.62
Right rear end	2.48	2.33	2.52	2.49	0.36	0.29	0.56

¹Values have been adjusted for covariates (parity, previous milk yield, somatic cell count, and previous cases of mastitis).